CLAIMS

What is claimed is:

1. A method of detecting specific lysis of a target cell, comprising:

a) contacting a labeled target cell with a lytic agent, wherein the target cell is labeled with a first plasma membrane-labeling fluorescent dye that labels the plasma membrane of the target cell and a first cytosol-labeling fluorescent dye that labels the cytosol of the target cell; and

b) determining the amount of the cytosol-labeling fluorescent label remaining in the target cell, wherein a reduction in the amount of the cytosol-labeling fluorescent label in the target cell when the target cell is contacted with the lytic agent, compared to a suitable control, indicates that the target cell is lysed by the lytic agent.

2. The method of claim 1, wherein said first fluorescent label is a lipid-associated fluorescent dye, and wherein said second fluorescent label is a fluorescent dye that labels proteins in the cytosol.

3. The method of claim 1, wherein the lytic agent is cell having lytic activity toward the target cell.

4. The method of claim 2, wherein the cell having lytic activity toward the target cell is an antigen-specific $CD8^+$ T lymphocyte, and the target cell displays the antigen in an MHC Class I molecule on its cell surface.

5. The method of claim 1, wherein the lytic agent is an antibody specific for a cell surface marker on the target cell.

6. The method of claim 1, wherein the lytic agent comprises an antibody specific for a cell surface marker on the target cell, and a lytic cell having an Fc receptor, wherein the lytic cell is selected from the group consisting of a neutrophil, an eosinophil, a macrophage, a monocyte, and a natural killer cell.

7. A method of detecting specific lysis of a target cell in a plurality of different target cells, comprising:

a) contacting a lytic agent with:

i) a first target cell labeled with a first plasma membrane-labeling fluorescent dye and a cytosol-labeling fluorescent dye; and

ii) at least a second target cell labeled with a second plasma membrane-labeling fluorescent dye and the cytosol-labeling fluorescent dye;

b) determining the amount of fluorescent label remaining in the first and at least the second target cell, wherein a reduction in the amount of the cytosol-labeling fluorescent dye in any of said target cells indicates that the target cell is lysed by the lytic agent; and

c) relating the plasma membrane-labeling fluorescent dye in the unlysed target cell to the identity of the unlysed target cell.

8. The method of claim 7, wherein at least one of said plurality of target cells is a control target cell.

9. The method of claim 7, wherein the at least two different target cells comprise cells from different potential tissue or organ donors, and the lytic agent is a cell from a prospective recipient of a tissue or organ.

10. The method of claim 9, wherein the donor target cells and the lytic cell are peripheral blood mononuclear cells.

11. A method of detecting specific lysis of a target cell in a plurality of different target cells, comprising:

a) contacting a lytic agent with

i) a first target cell labeled with a first cytosol-labeling fluorescent dye and a plasma membrane-labeling fluorescent dye; and

ii) at least a second target cell labeled with a second cytosol-labeling fluorescent dye and the plasma membrane-labeling fluorescent dye;

b) determining the amount of fluorescent label remaining in the first and at least the second target cell, wherein a reduction in the amount of the cytosol-labeling fluorescent dye in any of said target cells indicates that the target cell is lysed by the lytic agent; and

c) relating the cytosol-labeling fluorescent dye in the unlysed target cell to the identity of the unlysed target cell.

12. A method of detecting the presence in a cell sample of a cell having lytic activity toward a target cell, comprising:

a) contacting the cell sample with a target cell comprising a first fluorescent label in the plasma membrane of the target cell and a second fluorescent label in the cytosol of the target cell;

b) detecting specific lysis of the target cell by detecting a reduction in the amount of the second fluorescent label in the target cell, wherein specific lysis of the target cell indicates the presence in the sample of a cell having lytic activity toward the target cell.

13. The method of claim 12, wherein said first fluorescent label is a lipid-associated fluorescent dye, and wherein said second fluorescent label is a fluorescent dye that labels proteins in the cytosol.

14. The method of claim 12, wherein the cell sample being tested is a cell sample from a potential graft donor, and the target cell is a cell from a prospective graft recipient.

15. The method of claim 14, wherein the donor cell sample and recipient target cell is a blood cell.

16. The method of claim 15, wherein the donor cell sample is a bone marrow sample.

17. The method of claim 11, wherein the cell sample is an engrafted tissue in an individual, and the target cell is an endogenous cell from the same individual, and wherein detection of specific lysis indicates graft-versus-host disease.

18. A method of identifying an agent that modulates specific cell lysis, comprising:

a) contacting a labeled target cell and a lytic agent with a test agent; and

b) determining the effect of the test agent on specific lysis of the target cell by detecting an effect on the reduction in the amount of the second fluorescent label in the target cell, when compared to the reduction in the second fluorescent label in the target cell in the absence of the test agent.

19. The method of claim 18, wherein the test agent increases specific cell lysis.

20. The method of claim 18, wherein the test agent decreases specific cell lysis.

21. A kit comprising:

a first plasma membrane-labeling fluorescent dye that labels the plasma membrane of a eukaryotic cell; and

a first cytosol-labeling fluorescent dye that labels the cytosol of a eukaryotic cell.

22. The kit according to claim 21, further comprising at least a second plasma membrane-labeling fluorescent dye.

23. The kit according to claim 22, wherein the first plasma membrane-labeling fluorescent dye and at least the second plasma membrane-labeling fluorescent dye are each individually pre-mixed with the first cytosol-labeling fluorescent dye.

24. The kit according to claim 21, further comprising at least a second cytosol-labeling fluorescent dye.

25. The kit according to claim 24, wherein the first cytosol-labeling fluorescent dye and at least the second cytosol-labeling fluorescent dye are each individually pre-mixed with the first plasma membrane-labeling fluorescent dye.

26. The kit according to claim 21, further comprising one of:

a) a wash buffer; and

b) instructions for use.

27. A system for detecting specific cell lysis, comprising:

a plasma membrane-labeling fluorescent dye;

a cytosol-labeling fluorescent dye;

a target cell;

a lytic agent; and

a device for detecting fluorescence in a cell.